

## **REMARKS**

**The Examiner rejected Claims 1-32 under 35 U.S.C. 102(e) as being anticipated by Dunsmore (US 6,643,597). Applicant traverses the rejection.**

Claims 1 and 26 require a port-specific difference array, the difference array describing a difference between a first test fixture and a second test fixture at a corresponding test port of the test fixtures. The Examiner points to column 7, lines 55-67 and column 8, lines 22-40 of Dunsmore as teaching this limitation. Applicant submits that there is no teaching in the passage in question relating to a port-specific difference array. The passage does mention a calibration array 140, but offers no further details regarding the nature of that array. The Examiner has not pointed to any teaching that the elements of the array 140 represent differences of any type, let alone differences between a first test fixture and a second test fixture at a corresponding test port of the test fixtures. Hence, Applicant submits that Dunsmore does not anticipate Claim 1, Claim 26, or the Claims dependent therefrom.

Claim 4, which depends from Claim 1, additionally requires that the difference array is applied to the measured performance of the DUT to directly transform the measured DUT performance into the approximation of the hypothetical performance. The passages to which the Examiner points, column 7, lines 55-67 and column 8, lines 22-40, discuss a method of calibration using computer models, and considerations in selecting appropriate models. These passages do not disclose the limitation in Claim 4 relating to the application of a difference array to transform measured DUT performance into an approximation of hypothetical performance. Hence, Applicant submits that there are additional grounds for allowing Claim 4.

Claim 5, which depends from Claim 1, additionally requires that the difference array is applied to modify a calibration of a test system, such that the measured performance of the DUT produced using the test system is the hypothetical measured performance. The passages to which the Examiner points, column 7, lines 55-67 and column 8, lines 22-40, discuss a method of calibration using computer models, and considerations in selecting appropriate models. These passages do not disclose the limitation in Claim 5 relating to the application of a difference array to modify a calibration of a test system such that the measured DUT

performance using the test system is the hypothetical measured performance. Hence, Applicant submits that there are additional grounds for allowing Claim 5.

Claim 27, which depends from Claim 26, additionally requires that the port-specific difference array is applied to measurements of the DUT mounted in the second test fixture to transform the measurements into measurements that match the hypothetical measurements of the DUT in the first test fixture. The first set of passages to which the Examiner points, column 7, lines 55-67 and column 8, lines 22-40, discuss a method of calibration using computer models, and considerations in selecting appropriate models. These passages do not disclose the limitation in Claim 27 relating to the application of the difference array to transform measurements made in one fixture to match hypothetical measurement in another test fixture. The Examiner also points to column 12, lines 21-39. Applicant submits that this passage discusses a calibration method that involves measuring S-parameters of a test fixture and calibration standards, and does not disclose the limitation in Claim 27 relating to the application of the difference array to transform measurements made in one fixture to match hypothetical measurement in another test fixture. Hence, Applicant submits that there are additional grounds for allowing Claim 27 and the Claims dependent therefrom.

Claim 28, which depends from Claim 26, additionally requires that an element of the difference arrays is determined by optimizing a model across the plurality of frequencies using the calibration standard measurements. The Examiner has not pointed to any teachings in Dunsmore relating to this additional limitation. Hence, Applicant submits that there are additional grounds for allowing Claim 28.

In rejecting Claims 2-3, 11, and 13, the Examiner points to column 14, lines 61-67, column 15, lines 1-13, column 18, lines 55-67, and column 19, lines 1-10 as teaching that “the determined port-specific difference array is an error adaptor that is applied to the measured performance of the DUT to essentially remove an effect of a port portion of the second test fixture and to add an effect of a corresponding port portion of the first test fixture on the measured performance”. First, Applicant submits that the limitation which the Examiner discusses here is relevant only to Claim 2, not Claims 3, 11, and 13. Second, Applicant disagrees with the Examiner’s reading of Dunsmore as teaching all the limitations of Claim 2.

First, as discussed above with respect to Claim 1, from which Claim 2 depends, Applicant submits that Dunsmore does not teach the limitation relating to determining a port-specific difference array. Second, Claim 2 additionally requires that array to be applied to the DUT measurements to remove an effect of a port portion of the second test fixture and to add an effect of a corresponding port portion of the first test fixture. Applicant submits that the passages to which the Examiner points, column 14, lines 61-67, column 15, lines 1-13, column 18, lines 55-67, and column 19, lines 1-10, discuss models and their optimization, but do not disclose that any difference array is applied, nor that the calibration that is described therein has the effects regarding port portions of test fixtures that are required by the Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 2.

Claim 3, which depends from Claim 1, additionally requires that characteristics of a set of calibration standards are measured at corresponding ports of the two test fixtures by separately inserting each calibration standard of the set in each test fixture at a respective port; and solving for elements of the difference array using results obtained from measuring characteristics of the calibration standard set for each test fixture. Applicant submits that the passages to which the Examiner points, column 14, lines 61-67, column 15, lines 1-13, column 18, lines 55-67, and column 19, lines 1-10, discuss models and their optimization, but do not disclose the measurement of calibration standards in the manner specified by this Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 3.

Claim 11, which depends from Claim 1 through Claim 3, additionally requires that several equations are solved for several unknowns using the measured results, the solved unknowns representing the difference array elements. The passages to which the Examiner points, column 14, lines 61-67, column 15, lines 1-13, column 18, lines 55-67, and column 19, lines 1-10, discuss models and their optimization, but do not disclose the solving of several equations for several unknowns representing difference array elements. Hence, Applicant submits that there are additional grounds for allowing Claim 11.

Claim 13, which depends from Claim 1 through Claim 3, additionally requires that the measuring and solving are repeated for each port or each pair of ports of each of the test fixtures. The passages to which the Examiner points, column 14, lines 61-67, column 15,

lines 1-13, column 18, lines 55-67, and column 19, lines 1-10, discuss models and their optimization, but do not disclose the measuring and solving for each port or each pair of ports of each test fixture. Hence, Applicant submits that there are additional grounds for allowing Claim 13.

Claim 6, which depends from Claim 1, further requires that a performance of one or both of the test fixtures **and** a performance of one or more calibration standards of the set used in determining the port-specific difference array are unknown or poorly known. The Examiner points to column 6, lines 48-57 of Dunsmore as providing this additional teaching. Applicant submits that the passage to which the Examiner points discusses the use of calibration standards with unknown or poorly known performance characteristics but does not teach that the performance of any test fixture is unknown or poorly known, as required by the Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 6.

Claim 7, which depends from Claim 1, further requires that measurements of the test fixtures are determined at a plurality of frequencies in a frequency range of interest for the DUT. The Examiner points to Column 7, lines 33-51 of Dunsmore as providing this teaching. Applicant submits that this passage merely refers to an operational frequency range of the DUT and states that the calibration method taught by Dunsmore “may include a broader frequency range than the frequency range of interest”. Applicant submits that the Examiner has not pointed to any teaching regarding the measurement of test fixtures at a plurality of frequencies as required by the Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 7.

Claim 8, which depends from Claims 1 and 3, further requires that the set of calibration standards connect corresponding pairs of ports together so that all combinations of ports in each test fixture are separately connected as pairs for measuring the characteristics. The Examiner points to Column 12, lines 5-21 of Dunsmore as providing this teaching. Applicant submits that the passage, at most, teaches that one *thru* standard is used to connect one input portion and one output portion of one test fixture. The Examiner has not pointed to any disclosure that all combinations of ports in each test fixture are separately connected as pairs. Hence, Applicant submits that there are additional grounds for allowing Claim 8.

Claim 12, which depends from Claims 1 and 3, further requires optimizing a model using the measured results for each test fixture, the model representing one or more of the port-specific difference arrays, wherein optimizing comprises adjusting parameters of the model until a difference between test fixture measurements is minimized, the test fixture measurements being converted measurements of the second test fixture produced by the model using the measured results for the second test fixture and the measured results for the first test fixture, the model parameters representing the elements of the difference array. The Examiner points to Col. 8, lines 1-35 as providing this teaching. Applicant submits that this passage discusses computer models in a general way, offering no specific teachings regarding ports, difference arrays, optimization, or conversion between the two test fixtures. Hence, Applicant submits that there are additional grounds for allowing Claim 12.

Claim 14 depends from Claims 1 and 3, and Claim 29 depends from Claim 26, and Claims 14 and 29 additionally require that solving for elements of the difference arrays comprises determining a complex square root of one of the elements. The Examiner points to Column 13, lines 51-62 of Dunsmore as providing this teaching. Applicant submits that the passage in question relates to the use of the “least squares” metric, which is a mathematical technique of finding the “best fit” to a set of data by minimizing the sum of the squares of the differences between the fitted function (or model) and the data. The Claim limitation in question relates to finding a complex square root of one element in a difference array. The two mathematical operations are quite different. Hence, Applicant submits that there are additional grounds for allowing Claims 14 and 29 and the Claims dependent therefrom.

Claim 15 requires parameters of two test fixtures to be measured and used to adjust a calibration of the test system using differences between the measured parameters for corresponding ports of each test fixture, so that subsequent measurements taken with the test system for a DUT in either test fixture are approximately equal. The Examiner points to column 18, lines 55-67, column 19, lines 1-31 and Figure 5 of Dunsmore as teaching these limitations. Applicant disagrees with the Examiner’s interpretation of Dunsmore. First, Applicant submits that there is no teaching in the cited passage or Figure that the calibration method taught therein involves adjusting a calibration of the test system using **differences** between the measured parameters in the manner required by the Claim. Second, Applicant submits that there is no teaching in the cited passage or Figure that the calibration method

taught therein results in subsequent measurements of a DUT in either text fixture approximating each other. Indeed, Applicant submits that 430A and 430B, identified by the Examiner as the two test fixtures required by the Claim, are not taught as being choices for the same ports of the DUT. Neither fixture is a replacement for the other, so the requirement relating to the approximately equal measurements for a DUT in either of the two text fixtures is not taught. Hence, Applicant submits that Dunsmore does not anticipate Claim 15 and the Claims dependent therefrom.

Claim 32 requires that parameters of two test fixture are measured according to a calibration standard, a set of calibration factors is calculated according to the measured parameters of the test fixtures, and the test system is adjusted according to the calibration factors such that a measurement of a device under test (DUT) yields approximately the same result regardless of which of the two test fixtures is utilized in the DUT measurement. The Examiner points to column 18, lines 55-67, column 19, lines 1-31 and Figure 5 of Dunsmore as teaching these limitations. Applicant disagrees with the Examiner's interpretation of Dunsmore. As noted above with respect to Claim 15, Applicant submits that there is no teaching in the cited passage or Figure that the calibration method taught therein results in a subsequent measurement of a DUT in either text fixture yielding approximately the same result. Indeed, Applicant submits that 430A and 430B, identified by the Examiner as the two test fixtures required by the Claim, are not taught as being choices for the same ports of the DUT. Neither fixture is a replacement for the other, so the requirement relating to either one of them being utilized with approximately the same result is not taught. Hence, Applicant submits that Dunsmore does not anticipate Claim 32.

Claim 17, which depends from Claim 15, additionally requires that a port-specific difference array is determined for each port of the second test fixture and that the array transforms the measurements of the DUT in the second test fixture into measurements of the DUT as if measured with the first test fixture. The Examiner points to Column 14, lines 61-67, Column 15, lines 1-13 of Dunsmore as providing these teachings. First, Applicant submits that there is no teaching in the cited passage relating to the determination of a port-specific difference array. Second, Applicant submits that there is no teaching in the cited passage relating to the transformation of DUT measurements between second and first test fixtures. Hence, Applicant submits that there are additional grounds for allowing Claim 17.

Claim 18 depends from Claim 17 and additionally requires the construction and optimization of a port-pair model such that a separate model is constructed for each pair of ports of the second test fixture, each port-pair model converting a respective measured parameter into a corresponding converted measured parameter of the second test fixture. The passage cited by the Examiner (Column 14, lines 61-67, Column 15, lines 1-13) discusses models of a test fixture and of calibration standards but does not teach either the construction or optimization of a port-pair model of the type required by the Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 18 and the Claims dependent therefrom.

Claim 19 depends from Claim 18 and additionally requires optimizing attempts to reduce a difference between the converted measured parameters of the second test fixture and the measured parameters of the first test fixture. The passage cited by the Examiner (Column 14, lines 61-67, Column 15, lines 1-13) discusses models of a test fixture and of calibration standards but does not teach an optimization that satisfies the limitations of this claim. Hence, Applicant submits that there are additional grounds for allowing Claim 19.

Claim 20 depends from Claim 15 and additionally requires that parameters are measured at a plurality of frequency points in a frequency range of interest for the DUT. The Examiner points to Column 7, lines 33-51 for these additional teachings. As noted above with respect to Claim 7, Applicant submits that the cited passage merely refers to an operational frequency range of the DUT and states that the calibration method taught by Dunsmore “may include a broader frequency range than the frequency range of interest”. Applicant submits that the Examiner has not pointed to any teaching regarding the measurement of test fixtures at a plurality of frequencies as required by the Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 20.

Claim 21 requires that the computer program comprises instructions that, when executed by the computer, implement determining a port-specific difference array that adjusts for a difference between a first test fixture and a second test fixture when each is used to interface the DUT for measurements. The Examiner points to Column 19, lines 16-47 for these teachings. First, Applicant submits that the cited passage discusses programs and

models in relation to a test fixture, but does not describe the use of any type of difference array. Second, the cited passage is silent about adjusting for any difference between two test fixtures. Hence, Applicant submits that Dunsmore does not anticipate Claim 21 and the Claims dependent therefrom.

Claim 22 depends from Claim 21 and further requires that the difference array is applied to correct or adjust the measured performance of the DUT, such that the DUT performance measured using the second test fixture approximates a hypothetical DUT performance as if measured using the first test fixture to interface the DUT to the test equipment. The passage cited by the Examiner, Column 19, lines 16-47, discusses programs and models in relation to a test fixture, but does not teach correction or adjusting of the type required by this Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 22 and the Claims dependent therefrom.

Claim 23 depends from Claim 22 and further requires that the difference array is applied directly to the DUT measurements to transform the measured DUT performance into the hypothetical DUT performance. The Examiner points to Column 7, lines 55-67 and Column 8, lines 22-40 of Dunsmore for these teachings. Applicant submits that the cited passages describe model selection in a general way but are silent with respect to the specific transformation required by the limitations of this Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 23.

Claim 24 depends from Claim 22 and further requires that the difference array is applied to a calibration of the test equipment to correct calibration coefficients of the test equipment, such that the measured performance of the DUT is equivalent to the hypothetical DUT performance. As noted above with respect to Claim 23, the passages cited by the Examiner, Column 7, lines 55-67 and Column 8, lines 22-40. describe model selection in a general way but are silent with respect to the specific transformation required by the limitations of this Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 24.

Claim 25 depends from Claim 21 and further requires that the computer program comprises instructions that implement determining a complex square root of an element of



the difference array using values of the element at a plurality of frequencies. The Examiner points to Column 13, lines 51-62 of Dunsmore as providing this teaching. As noted above with respect to Claim 14, Applicant submits that the passage in question relates to the use of the “least squares” metric, which is a mathematical technique of finding the “best fit” to a set of data by minimizing the sum of the squares of the differences between the fitted function (or model) and the data. The Claim limitation in question relates to finding a complex square root of one element in a difference array. The two mathematical operations are quite different. Hence, Applicant submits that there are additional grounds for allowing Claim 25.

I hereby certify that this paper is being sent by FAX to 571-273-8300.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Calvin B. Ward".

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Date: May 7, 2007

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